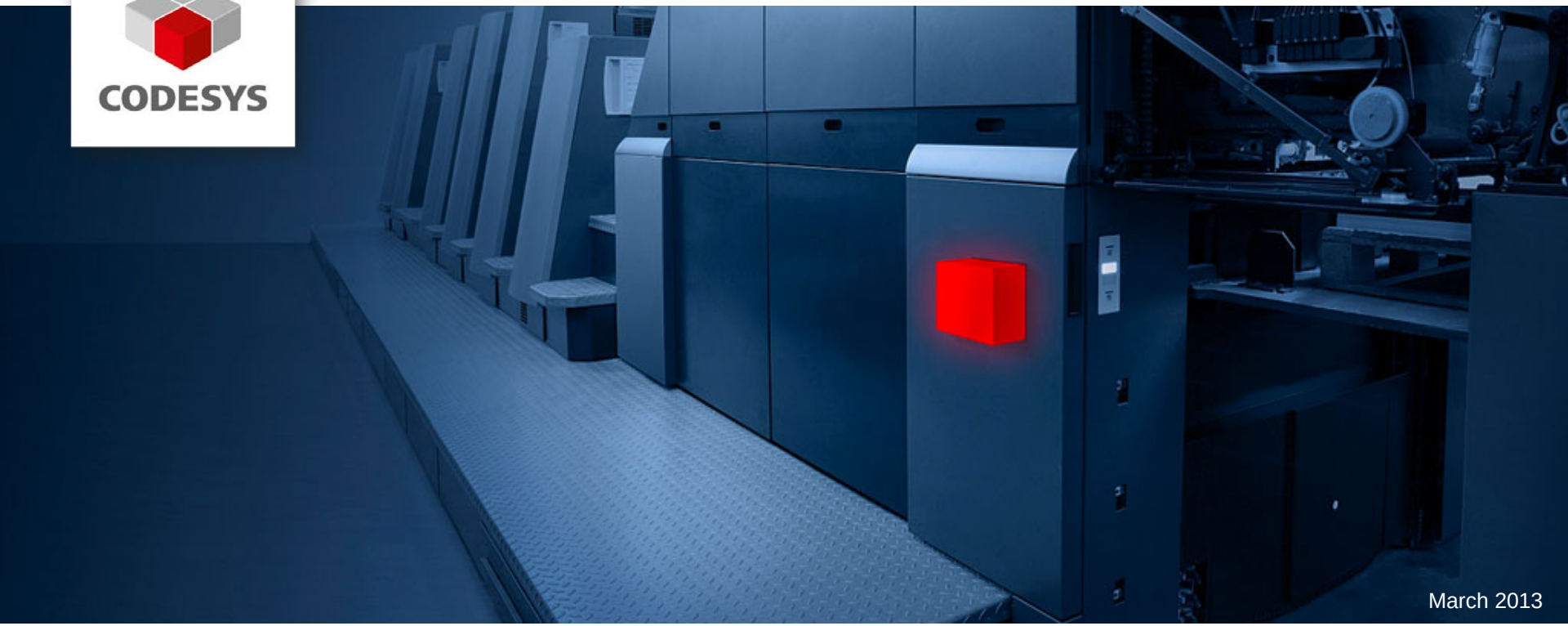
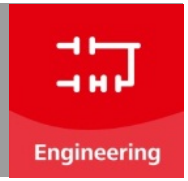
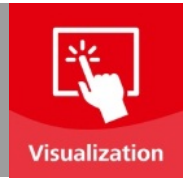


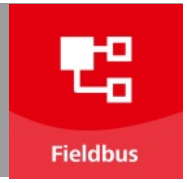
CODESYS V3.5 Service Pack 3
Features & Improvements

Agenda

1. Engineering
2. Motion + CNC
3. Visualization
4. Fieldbus







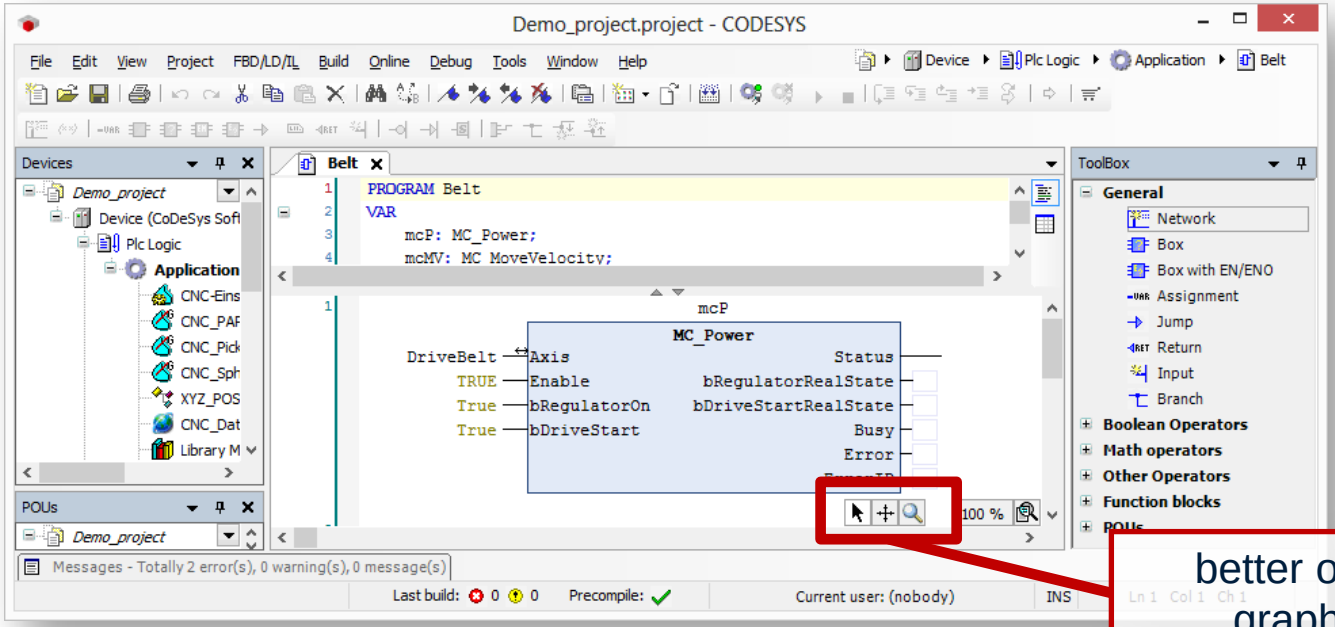
Engineering: Overview

Engineering

- Usability Improvements
- Improved CFC editor
- Test Manager
- Chinese identifiers for Flow Control / Online Change / Compiler
- Static Analysis Light
- Trace
- CODESYS Application Composer: Diagnosis Generator

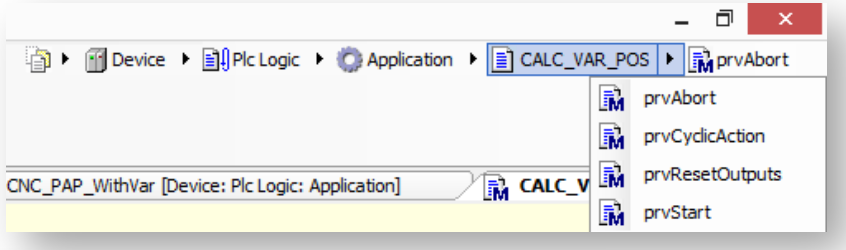
Graphical editors

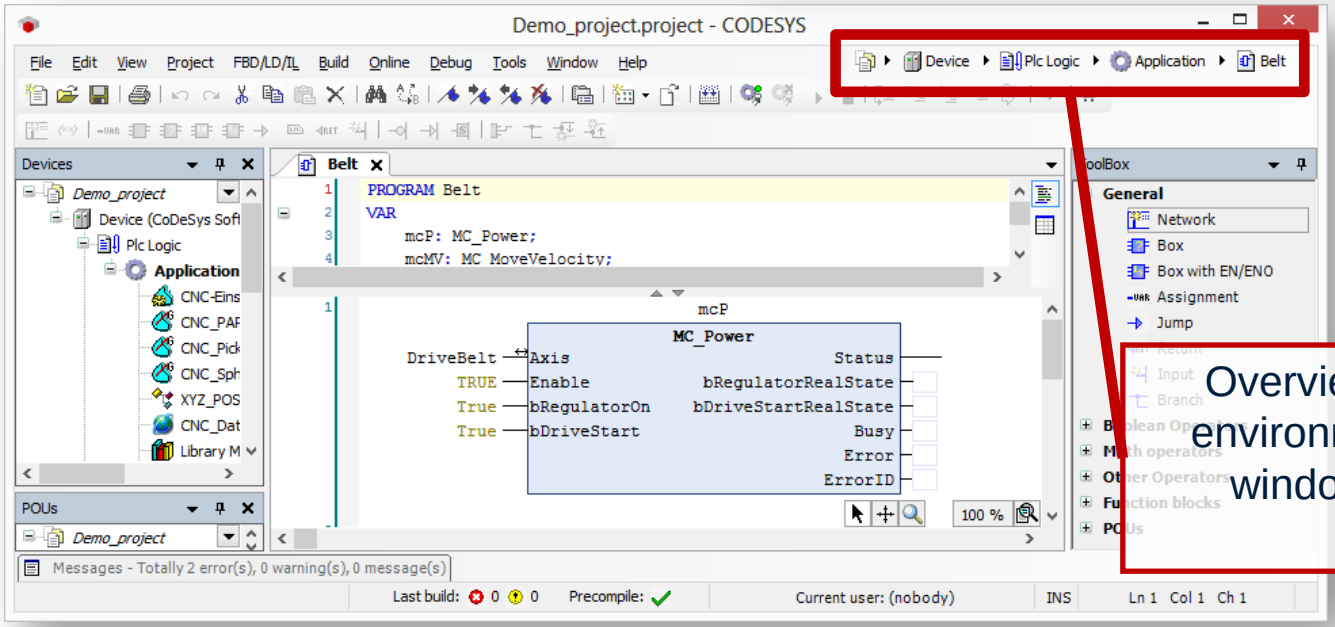
- Better overview
- As before: highligt, select
- Panning function: Moving the worksheet
- Magnifier function: Overview with quick zoom on subarea



Graphical editors

- Breadcrumb navigation



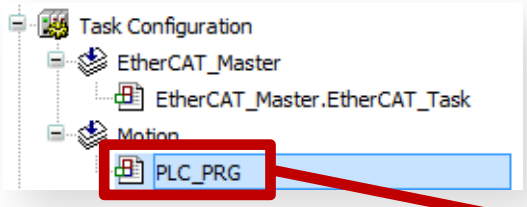


Overview on the project environment – „Devices“-window may become redundant

Engineering: Usability

Drag & Drop

- PRGs into the task configuration
- Variables into the watch list

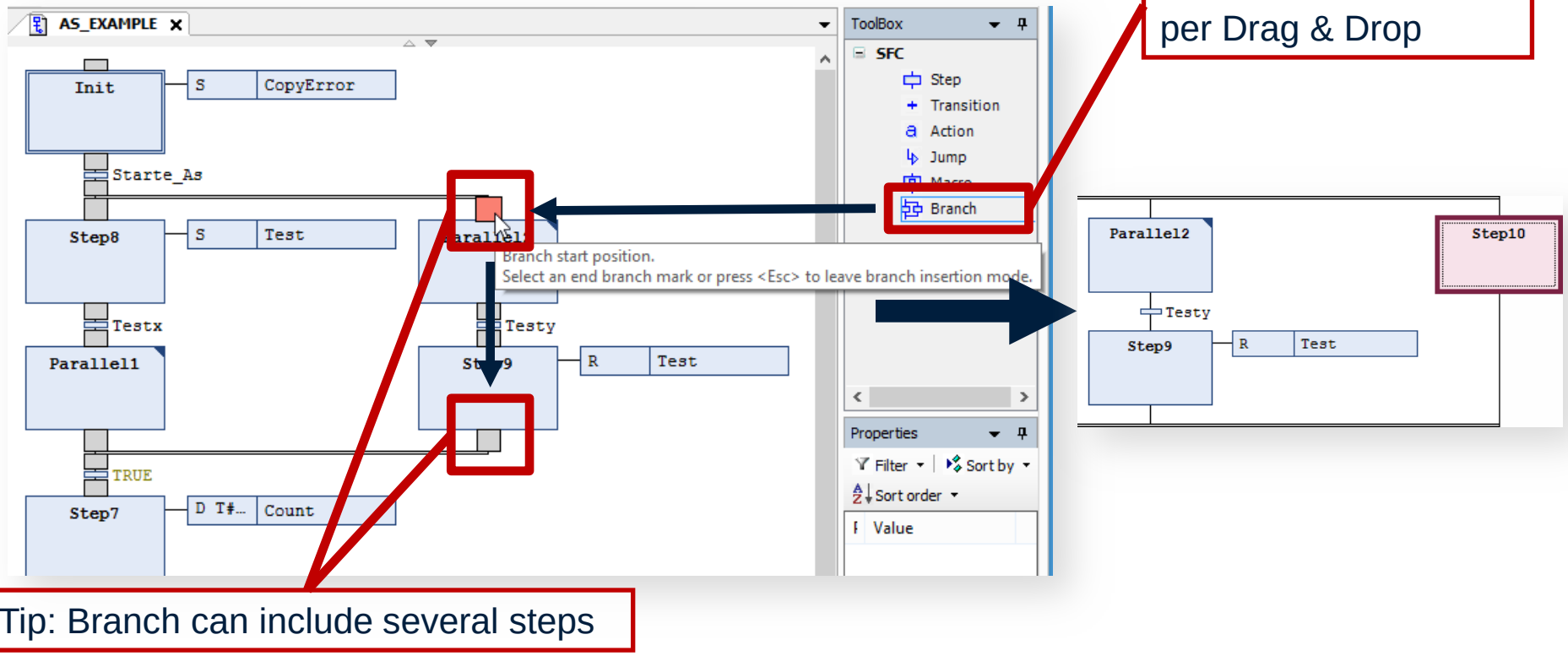


PRG per Drag & Drop into a task

Variables per Drag & Drop from the declaration and code part into the watch list

Drag & Drop

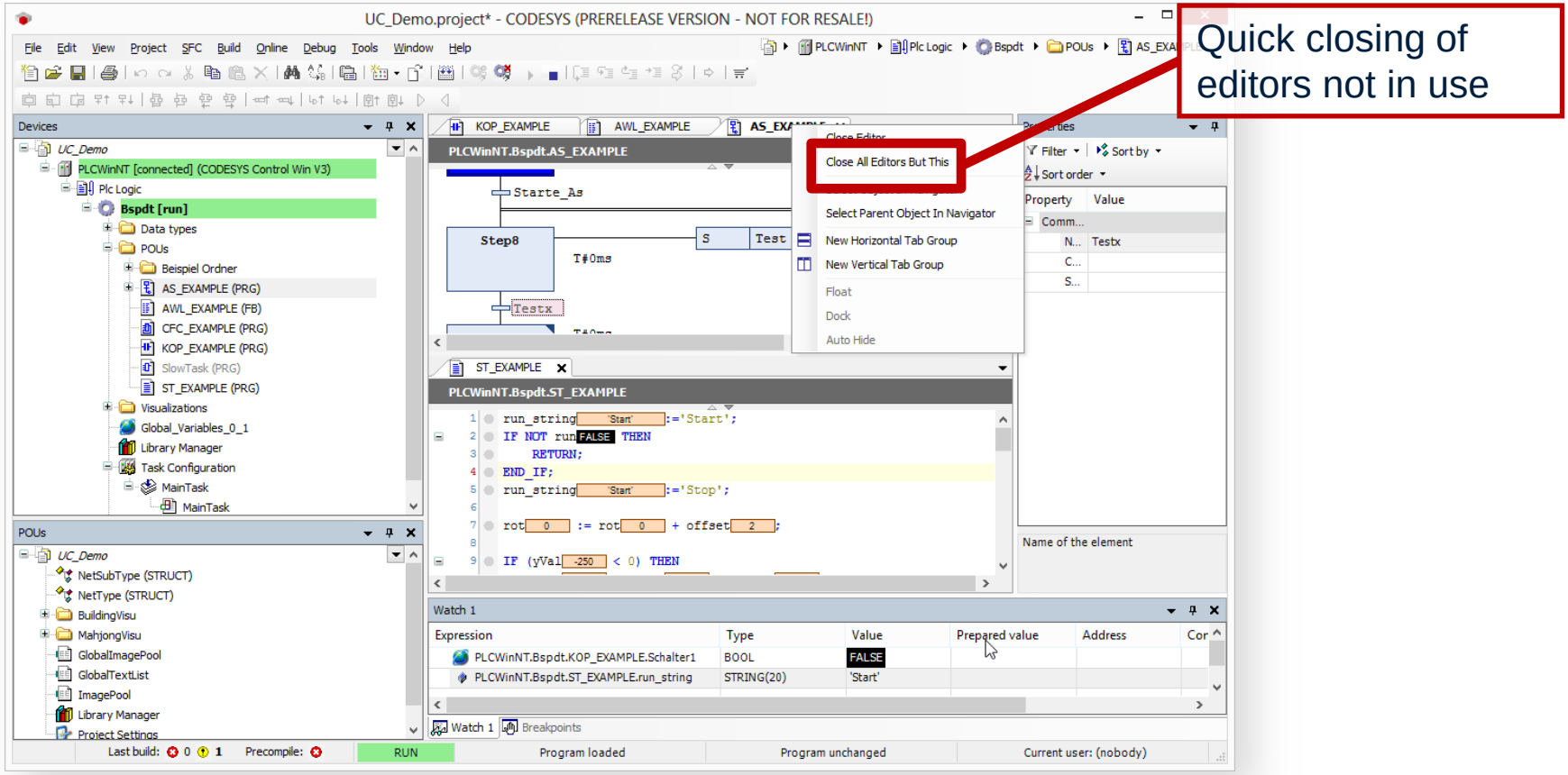
- In SFC



Engineering: Usability

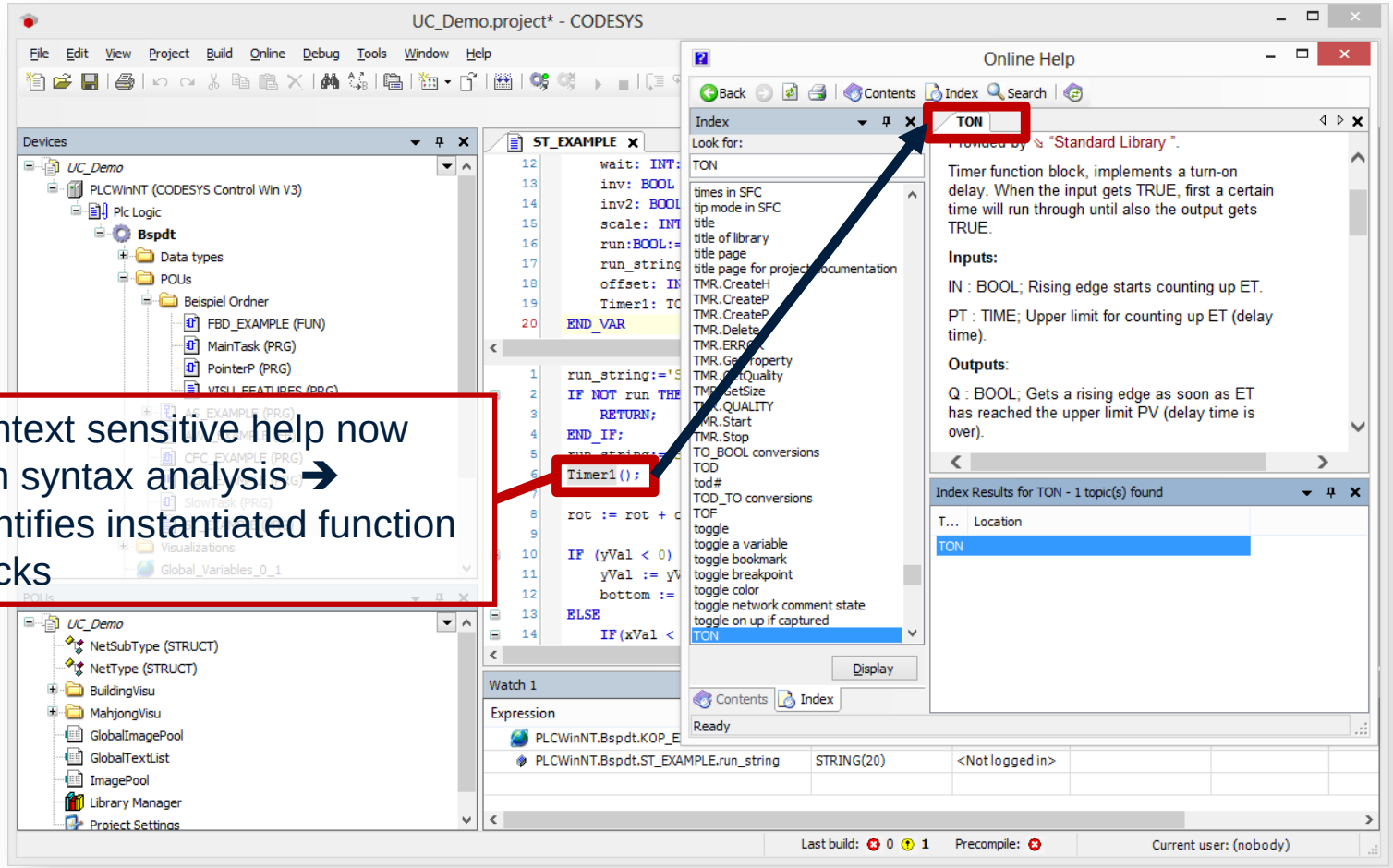
Simplification

- „Close All Editors But This“



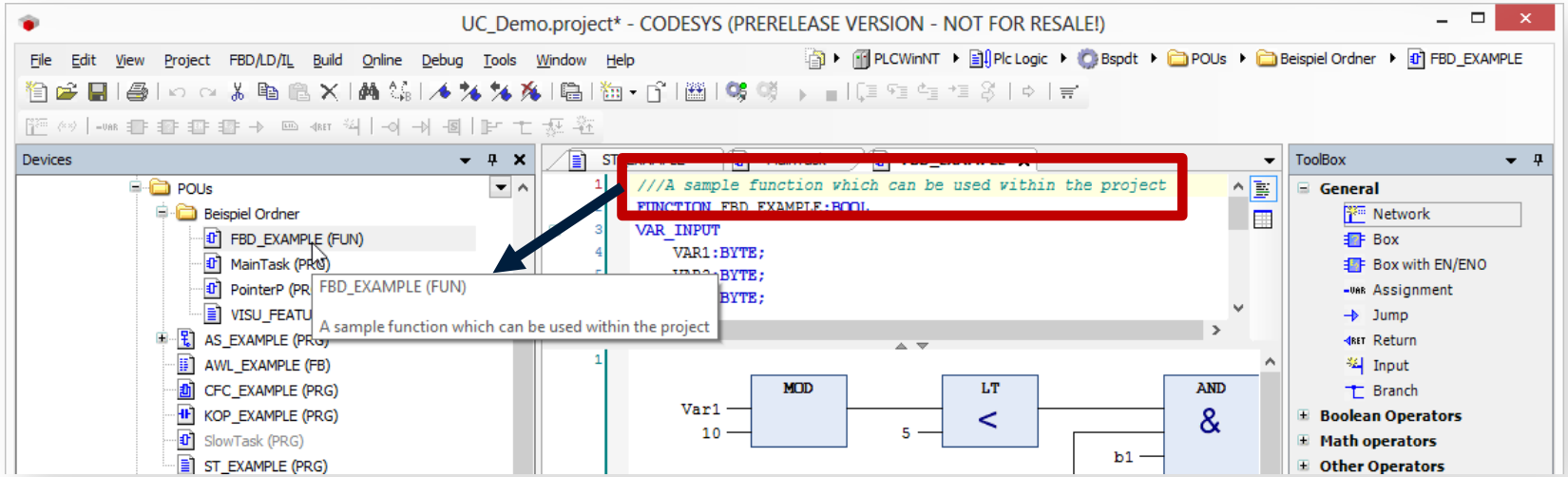
Simplification

- F1 more intelligent than before

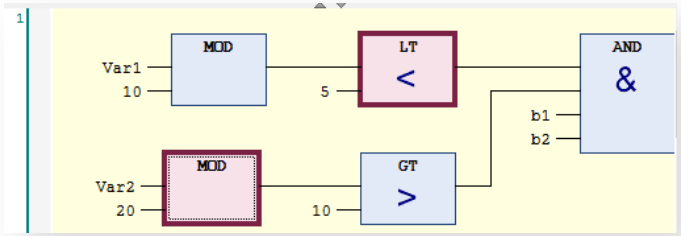


Facelift

- Toggle between different editors: constant size of the toolbar
- Function block comment now in the tool tip of the device manager



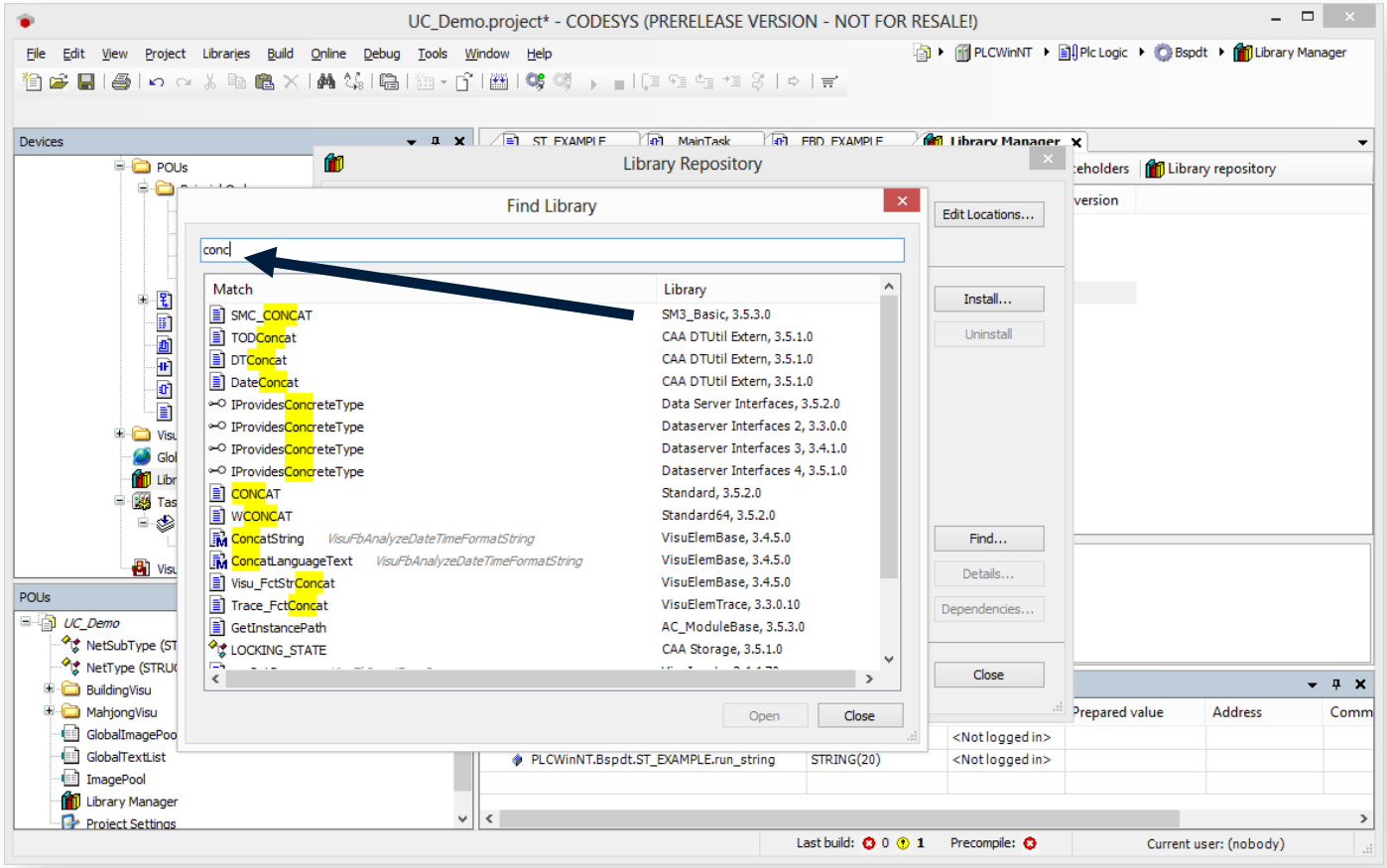
- Graphical editors: clearer selection



Engineering

Performance

- Full-text search in libraries (also comments)



Engineering: CFC „Advanced Routing Mode“

Engineering

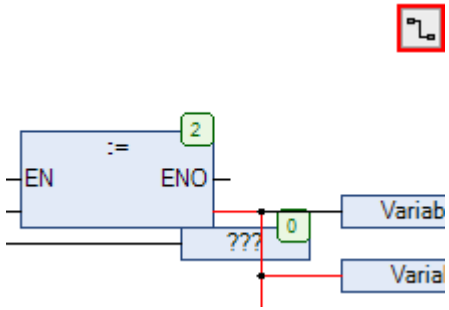
- For routing connections: press button 
  - In the background: routing charts generated
  - No more graphical routing on scrolling/zooming
  - Considerably faster processing of large CFC POUs
  - Press button  to explicitly execute routing

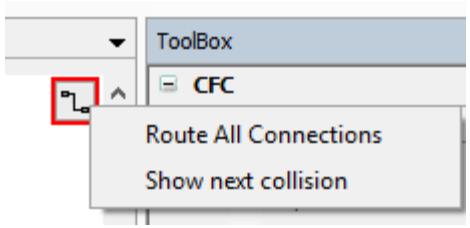
Engineering: CFC „Advanced Routing Mode“

Engineering

- Collisions:
  - Element on a line
  - Line on an element

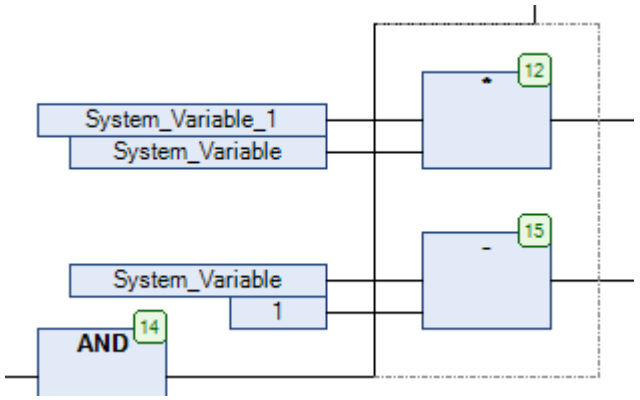
➔Indication through color change
➔Click to indicate collision
➔Click to route anew



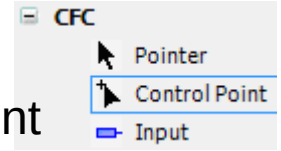


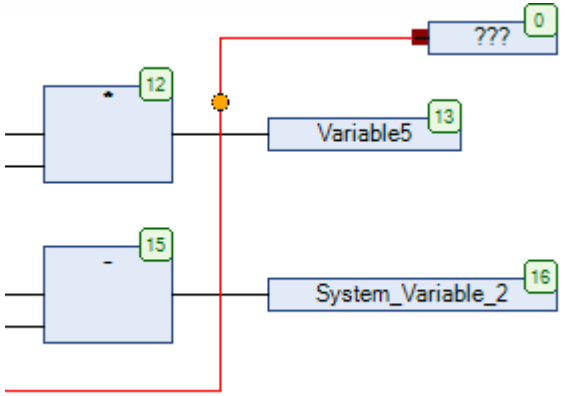
Engineering: CFC Manual Routing of connections

Engineering



- Requirement:
  - Line is not between two connections
  - Workaround: set control points
- Temporary:
  - Simply drag a line
  - New start of the automatic routing resets the line
- Persistent:
  - Set control points
    ➔ Auto-Routing takes them into account



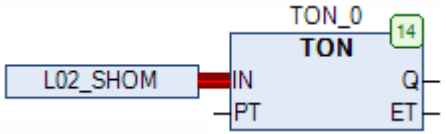


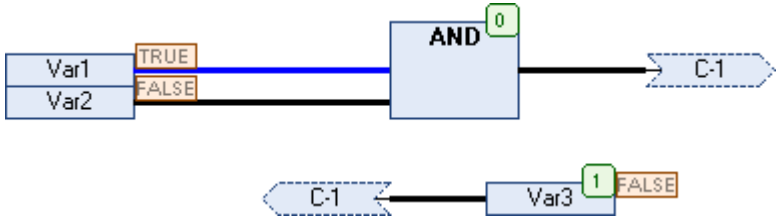
- Managing the control points
  - Individual delete
  - Indication of control points when selecting a line or on mouse-over
  - Delete all control points at the same time

Engineering: Further CFC Improvements

Engineering

- Connecting Pins:
  - Connection only exists if displayed explicitly
  - Auto-Connect option under Tools/Options/CFC Editor
- Names for instances are suggested automatically
  - Faster declaration of FB instances
- Monitoring
  - of Boolean values now blue/black (as usual ☺)
  - of values at non-connected pins





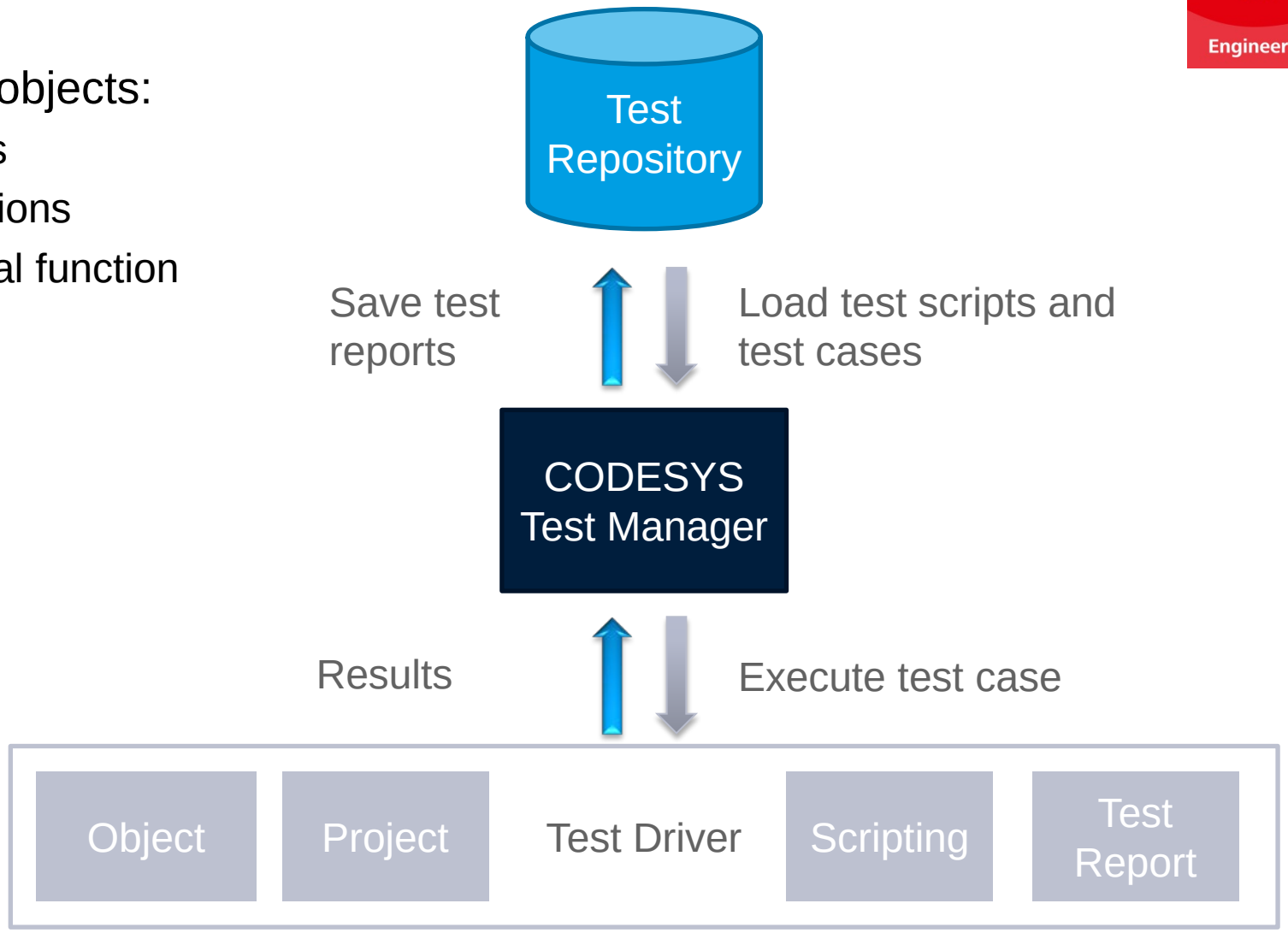
Engineering: Preview CODESYS Test Manager

Engineering

- The CODESYS Test Manager
  - Completely integrated in CODESYS
  - For creation, execution and assessment of test scripts
- Functionality
  - Test scripts are saved in a joint test repository.
  - A test script consists of test cases which themselves consist of test actions.
  - The test actions are executed by the test driver.
  - The CODESYS Test Manager is an interpreter for test scripts.
  - The Test Manager provides dialogues to allow for a comfortable entry of test scripts.
  - The results of the test script execution (test cycles) are clearly laid out in a test report.

Engineering: Preview CODESYS Test Manager

- Testable objects:
  - Libraries
  - Applications
  - Individual function blocks



Engineering: Preview CODESYS Test Manager

Engineering

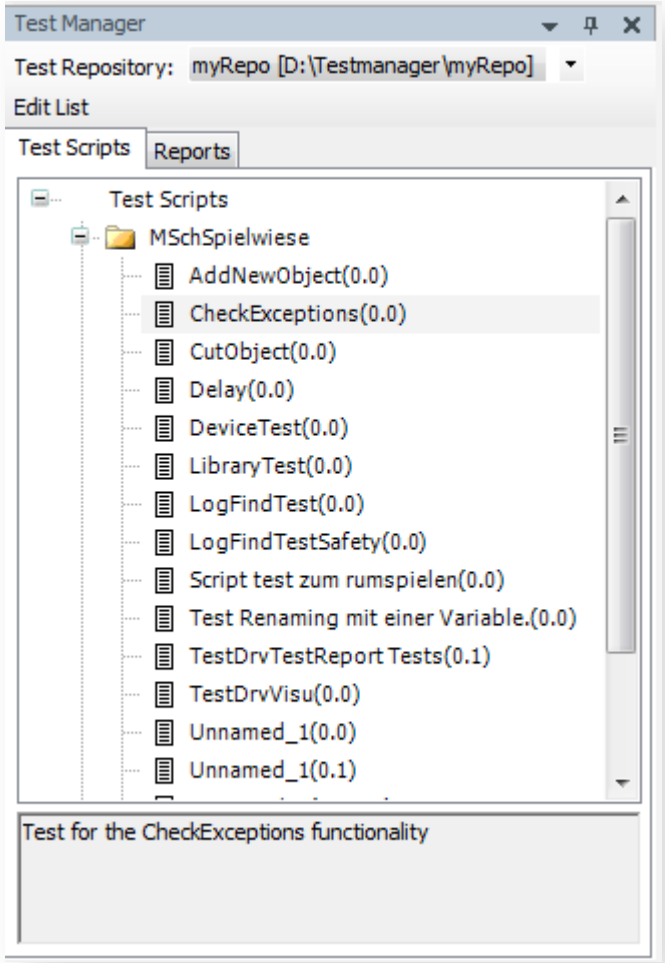
- Install and start Test Manager
  - Install and license Test Manager with the Package Manager – most easily from the CODESYS Store.
  - Start Test Manager under “Tools” - “Test Manager”

→ At the first start, a repository for test scripts and reports will be created automatically.

Engineering: Preview CODESYS Test Manager

Engineering

- Test Repository
  - File path for test scripts and test reports
  - Project spanning
  - Structuring through folders (categories)
  - Based on a file system

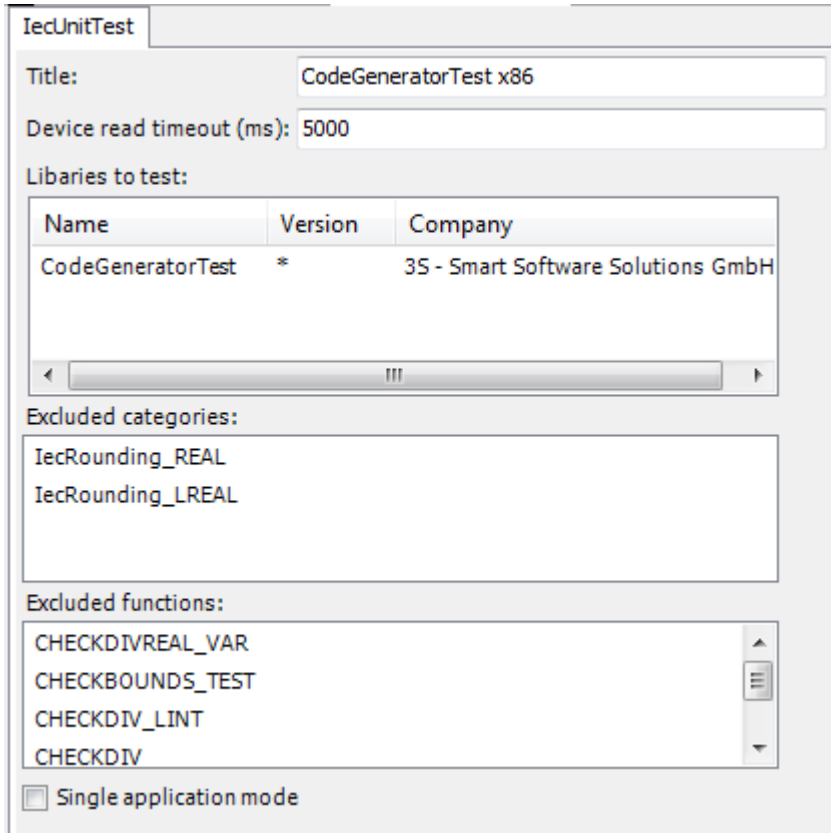


Engineering: Preview CODESYS Test Manager

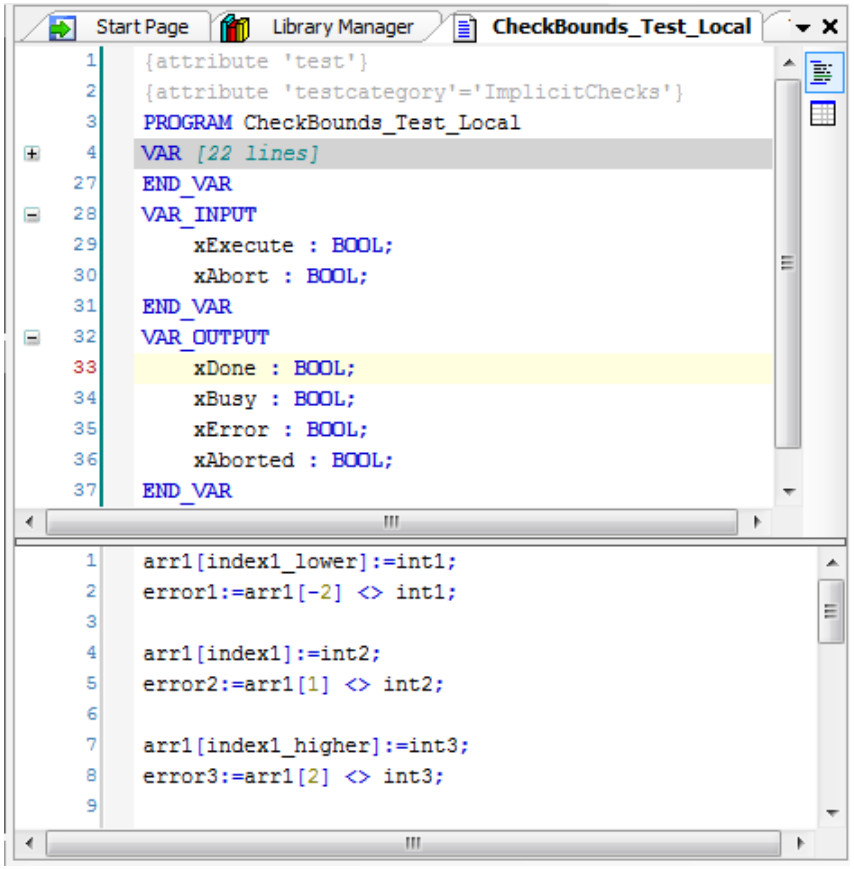
Engineering

- Unit Tests

Configuration



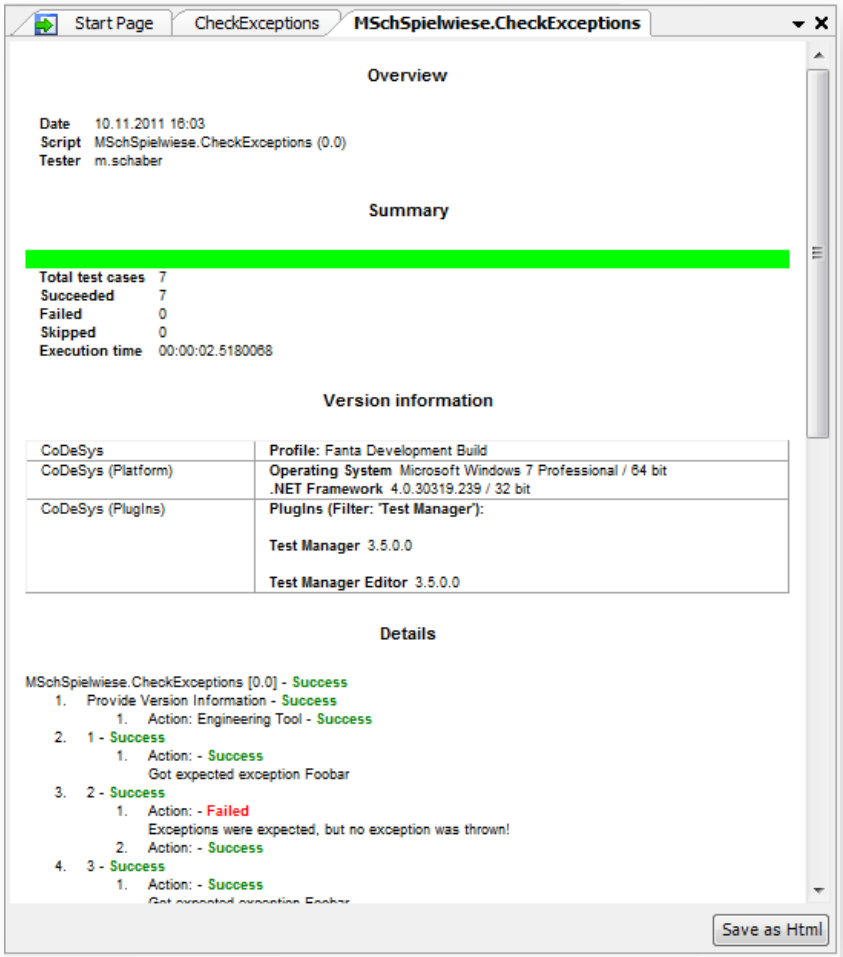
Test code



Engineering: Preview CODESYS Test Manager

Engineering

- Test Report
  - Content:
    - When/Who/What
    - Version information
    - Test evaluation at a glance and in detail
  - XML format
    - For automatic evaluation
  - Exportable as HTML



Engineering: Preview CODESYS Test Manager

Engineering

- The CODESYS Test Manager allows for the automatic execution of complex test procedures.
- The CODESYS Test Manager was designed
  - for application developers
    - for testing their FBs, libraries and applications
  - for device manufacturers
    - for testing their devices
    - for testing their libraries
  - for 3S-Smart Software Solutions
    - for automated CODESYS testing
      - in use for more than 5 years
      - approx. 50.000 test cases per Service Pack

Engineering: Chinese Identifiers

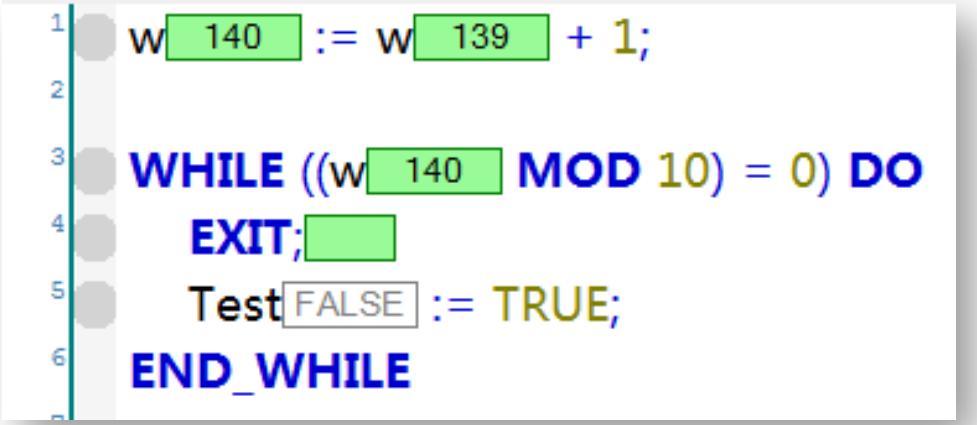
Engineering

- For variables and POUs
- NOT for
  - Symbol configuration
  - Application information
  - Wherever a variable name apperars as an IEC string

Engineering: Flow Control

Engineering

- Display of executed lines without variables



Engineering: Retain

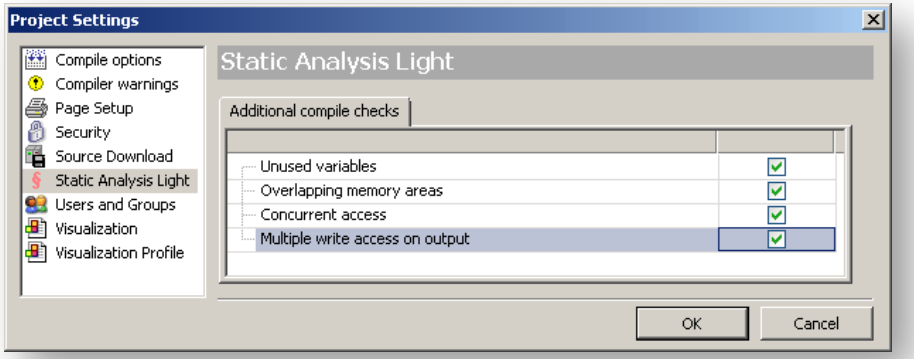
Engineering

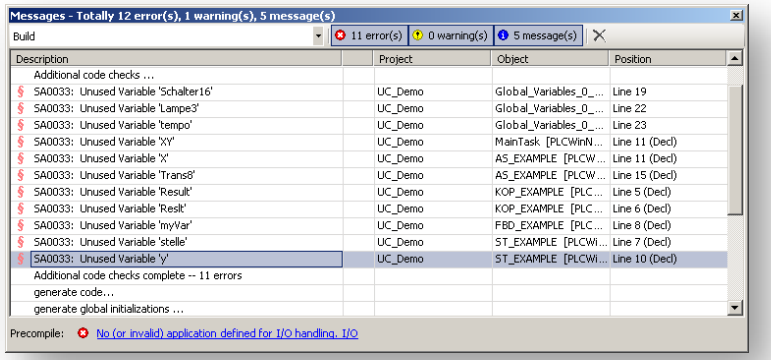
- Checksum to identify retain data
- Up to now, data guid has been used
- Advantage:
  a boot project will more often match the saved retains

Engineering: Static Analysis Light

Engineering

- In the scope of delivery of CODESYS V3.5 SP3
- Includes tests as in CODESYS V2.3:
  - Unused variables
  - Overlapping memory areas
  - Concurrent access
  - Multiple write access on output
- Configured code analysis is executed automatically during code generation.





Engineering: New CPU Platform

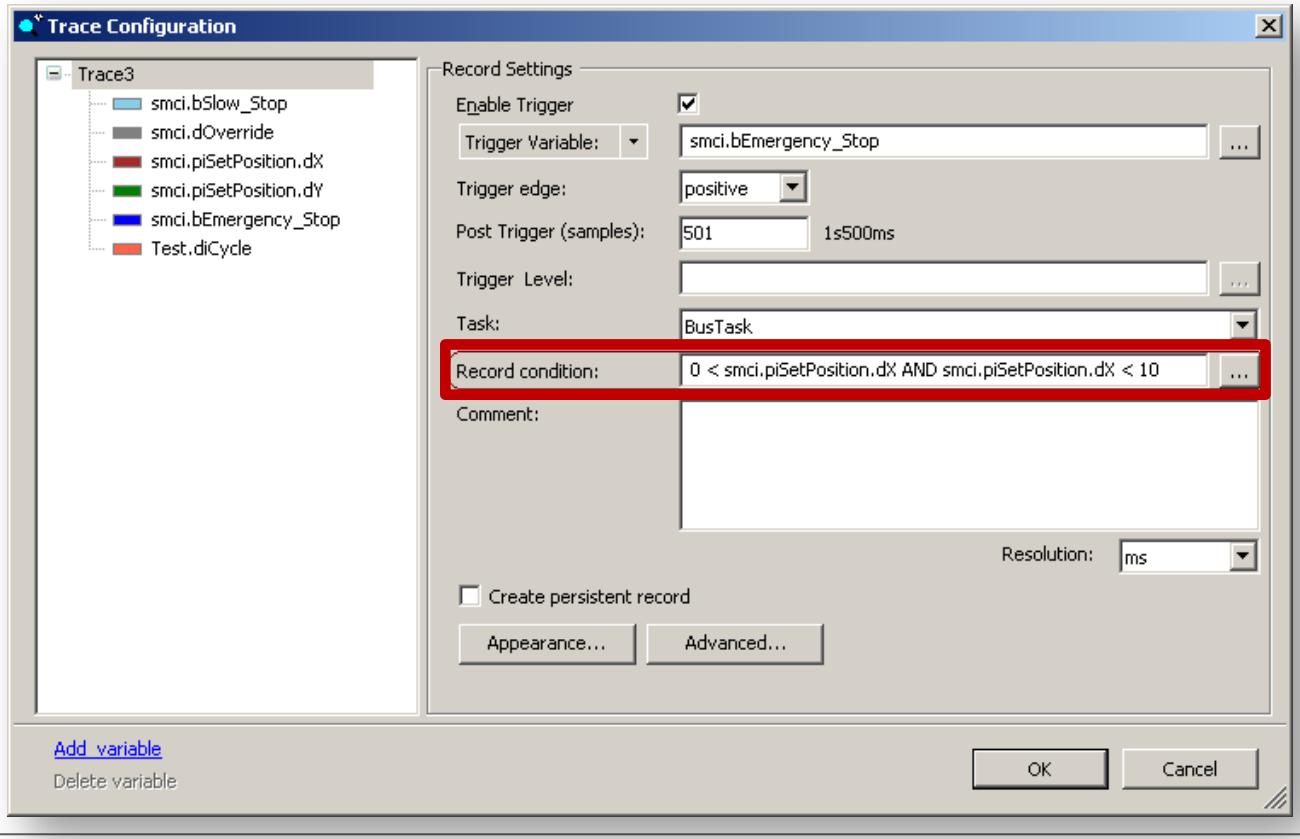
Engineering

- New code generator for the Renesas RX processor family (RX200 / RX 600)

Engineering: Trace

Engineering

- Boolean expression within the record condition
- Requires new component (monitoring component) within the runtime system (RTS)



Engineering: Online Change Optimization

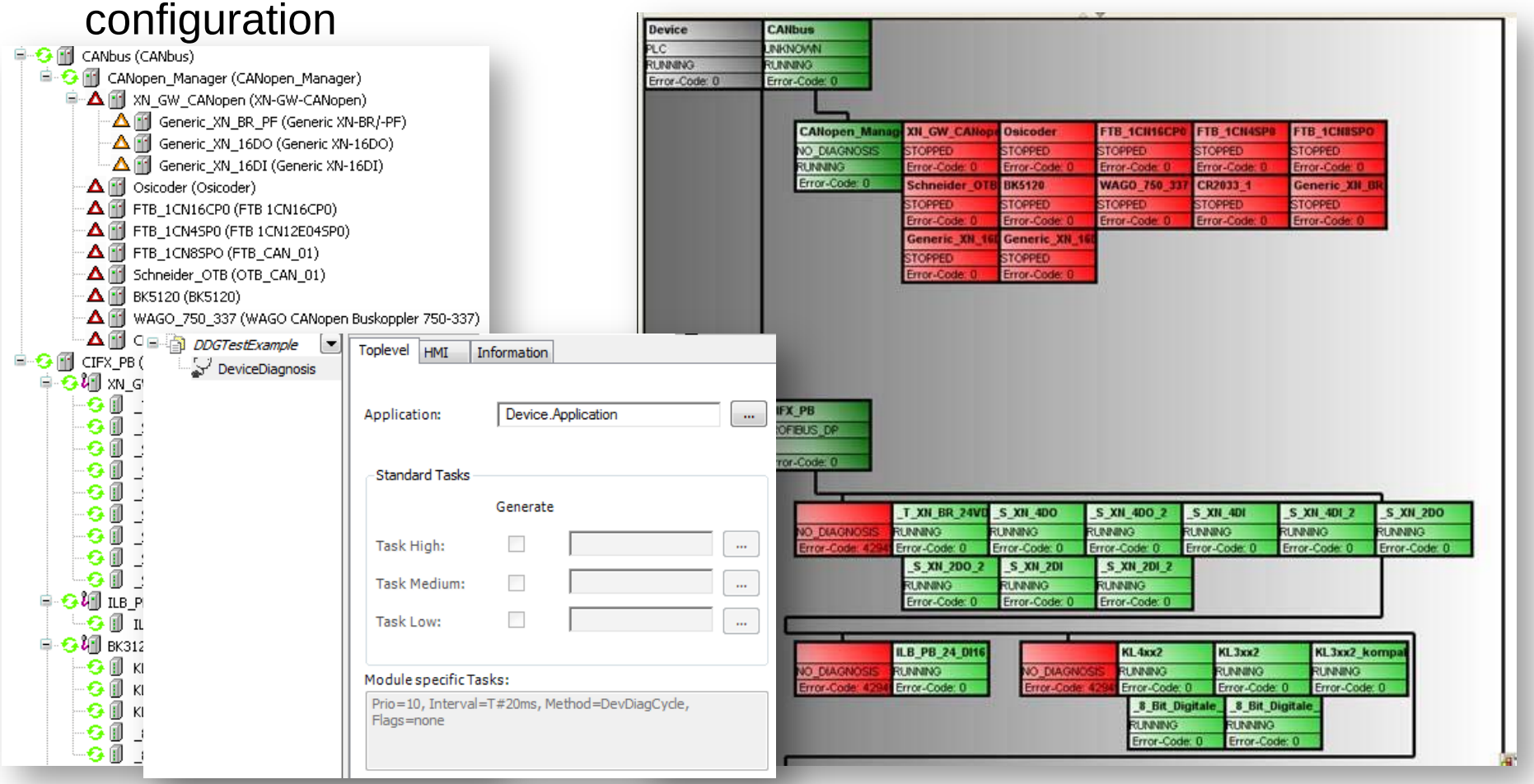
Engineering

- Online Change now faster after the following changes:
  - Code changes
  - Local variables in functions, methods, programs
  - New global variables
  - Call of new functions
  - Changes of initial values
- Faster generation of boot projects after online change (since SP 2)
- Code generation in general 5 – 10% faster

CODESYS Application Composer: Diagnosis Generator

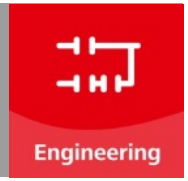
Engineering

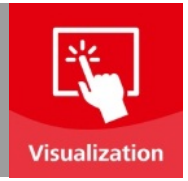
- Automatically generated diagnosis visualization for the fieldbus configuration



Agenda

1. Engineering
2. Motion+CNC
3. Visualization
4. Fieldbus

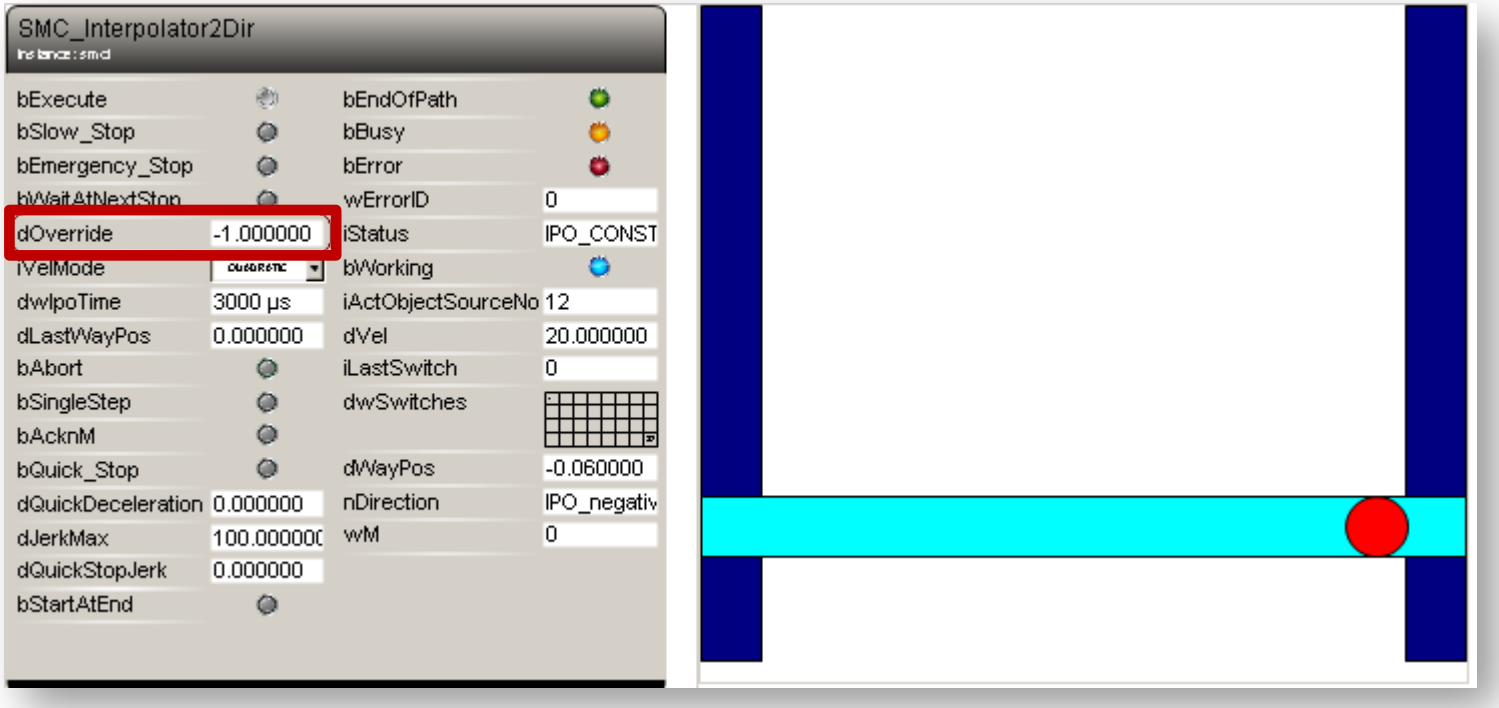




Motion+CNC: Ipo2Dir

Motion + CNC

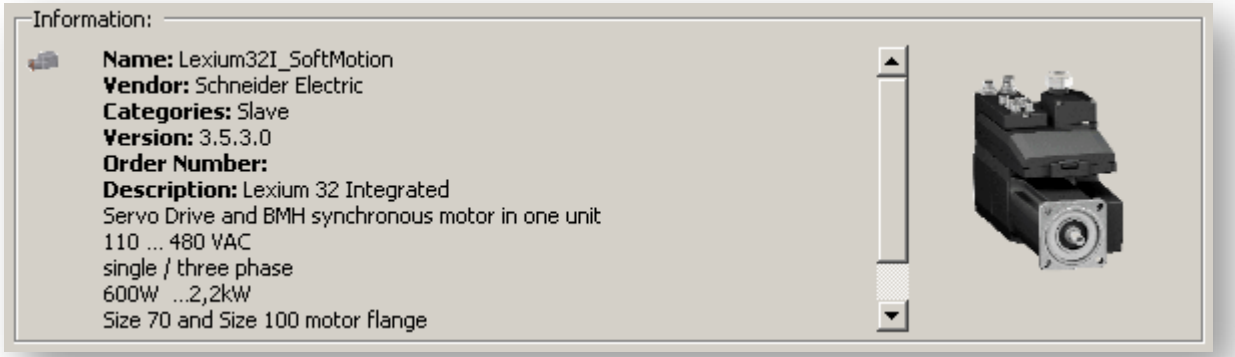
- CNC interpolator that can drive forwards and backwards: Reversing now possible even if not the complete path fits into the queue.



Motion+CNC: New driver

Motion + CNC

- Lexium32i drive now supported.



Agenda

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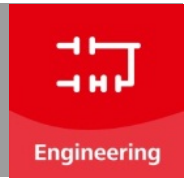
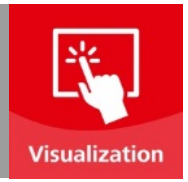
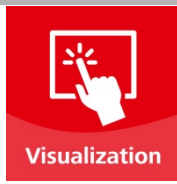




Visualization: Overview



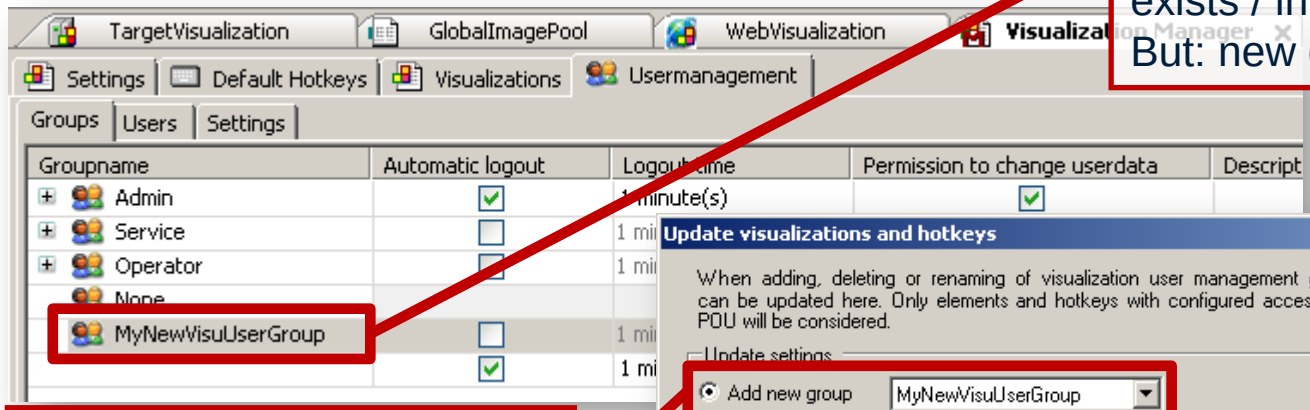
- Visualization User Management
- SVG graphics
- IEC interface to Alarm Management
- Editor improvements
- Improvements for Target Visualization under Windows CE

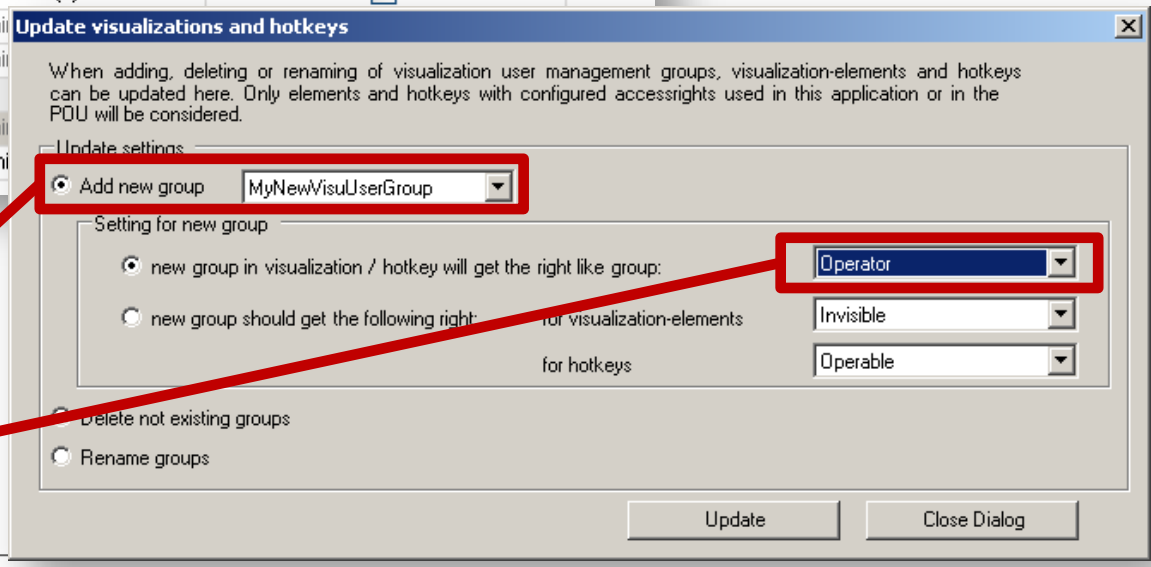
Visualization: User Management

Visualization

- **User management now released**
  See „Features and Improvements V3.5 SP2”
- New dialog:
  “Update visualizations and hotkeys”

Use case:
User Management for visualization objects already exists / in use.
But: new group necessary!





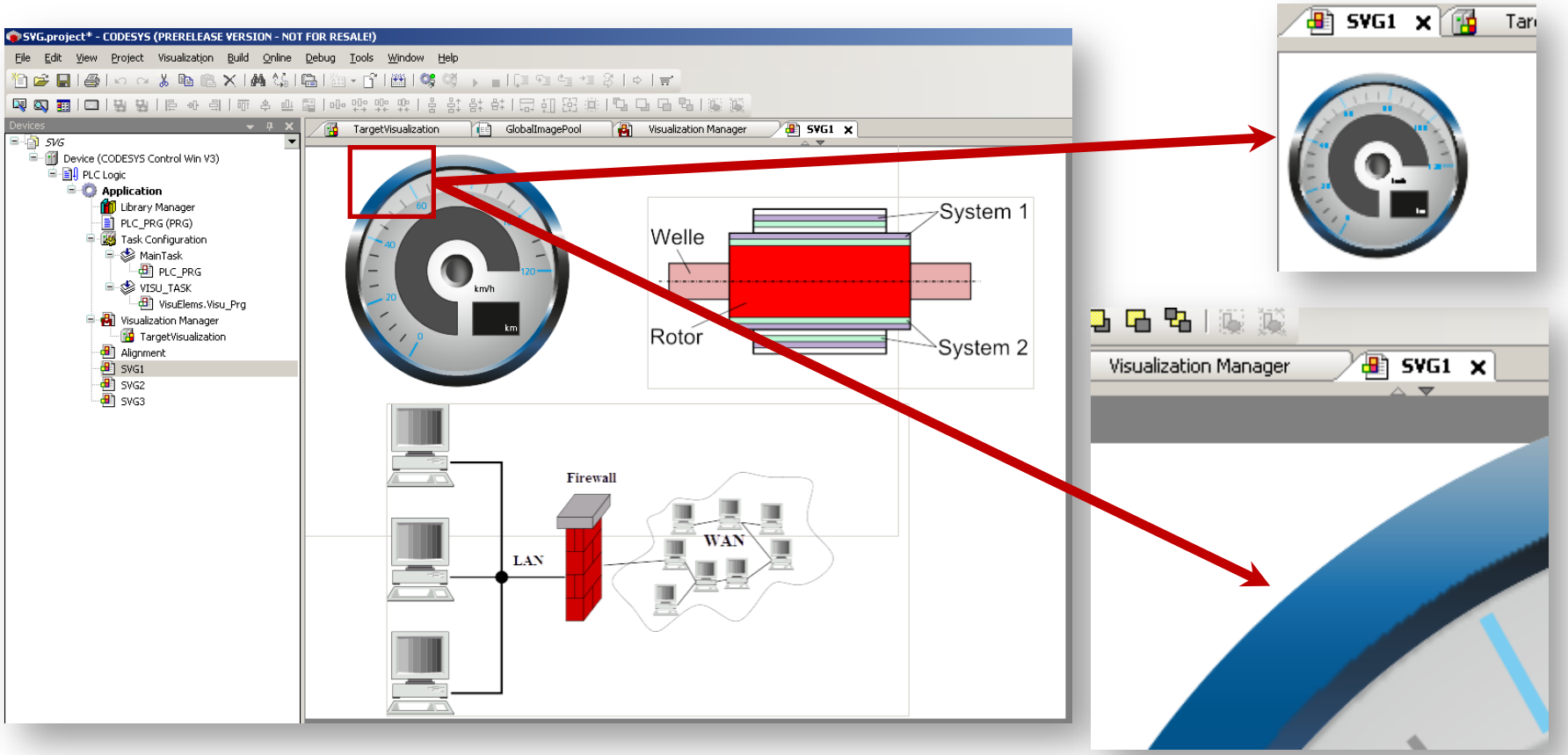
Automatically include new group into all existing objects

Based on rights of an existing group

Visualization: Support of SVG graphics

Visualization

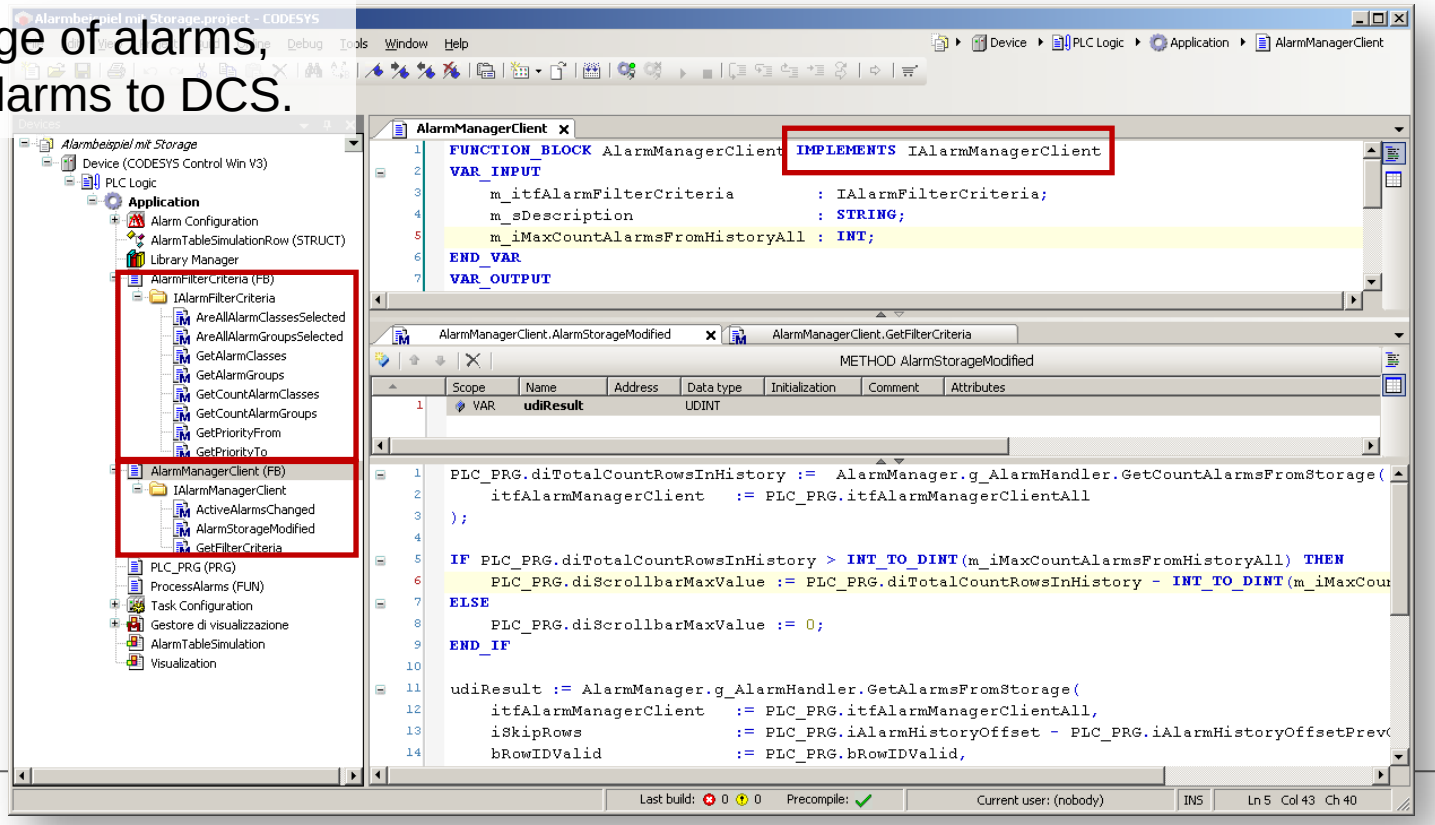
- Import of scalable vector graphics (SVG files)
- Graphics may now be scaled without quality loss



Visualization: Alarm Management

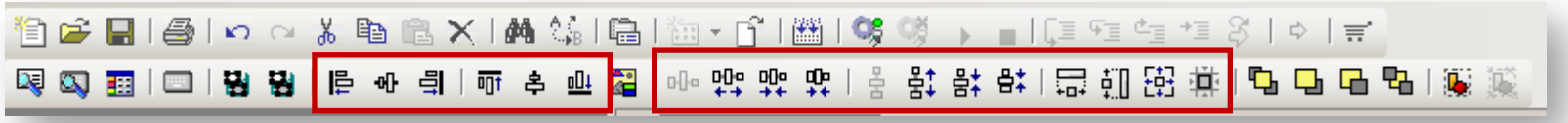
Visualization

- Open IEC interface by extension of AlarmManager.library: new interfaces *iAlarmManagerClient* und *iAlarmFilterCriteria*
  - Active and historical alarms can be further processed by the application code
  - Typical use cases: Archival storage of alarms, handover of alarms to DCS.

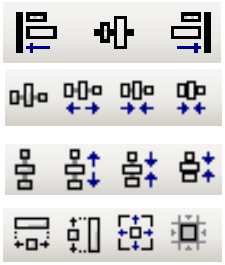


Visualization: Editor Improvements

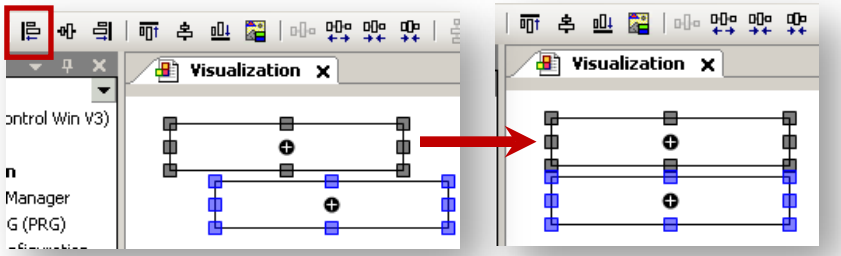
Visualization

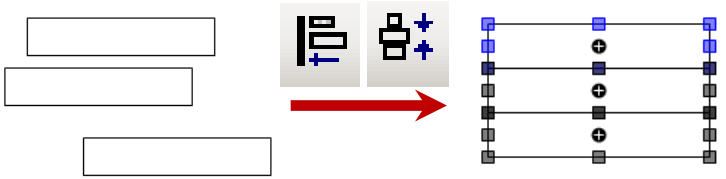


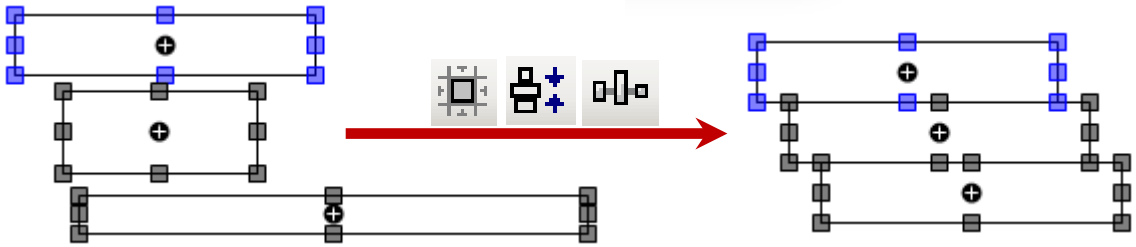
- Additional alignment commands for the arrangement of multiple elements
  - Left- / right-aligned / centered
  - Adapt / arrange / delete horizontal distances
  - Adapt / arrange / delete vertical distances
  - Adapt element dimensions / size to grid



- Examples:



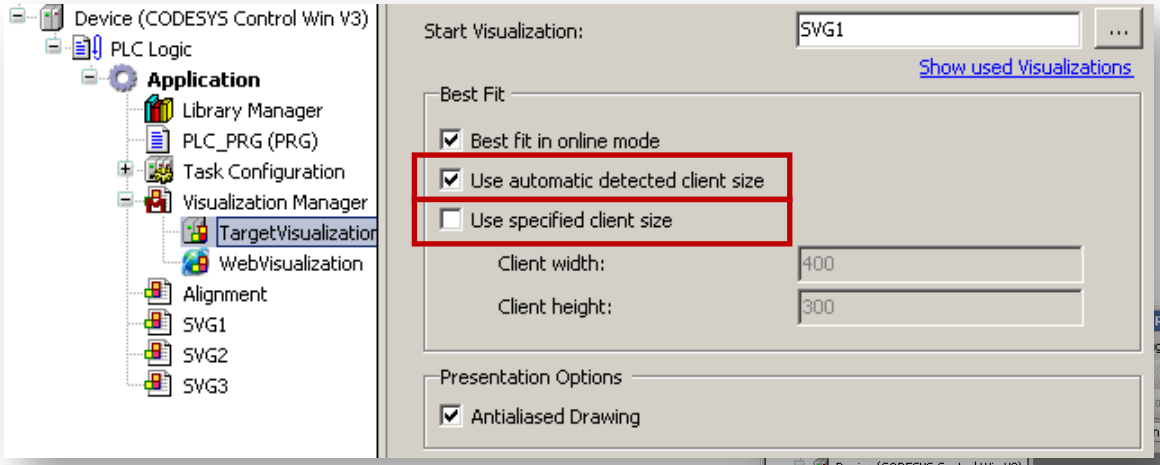


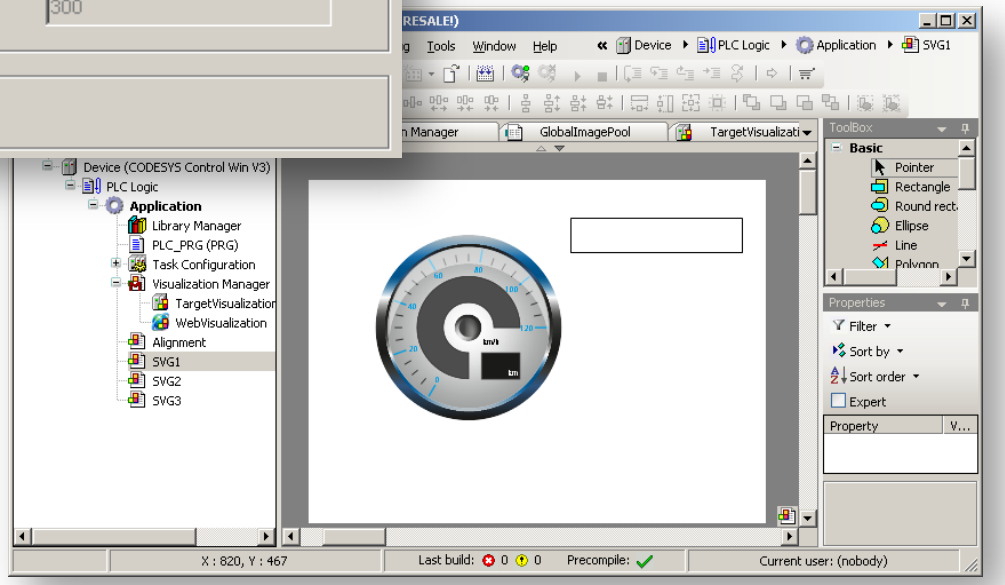


Visualization: Editor Improvements

Visualization

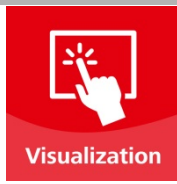
- Configuration of the display dimensions on the device





- Dimensions may be determined by the device description or by the user
- Specific dimensions for CODESYS WebVisu

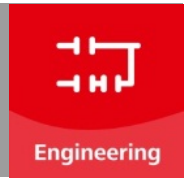
Visualization: Further Improvements

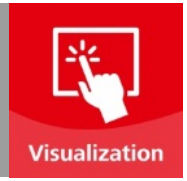


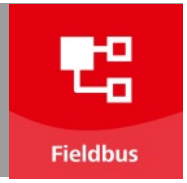
- Windows CE target visualization:
  - Support of graphics format png (portable network graphics)
  - Support of color gradients
  - An update of the runtime is requested in order to obtain these improvements.

Agenda

1. Engineering
2. Motion+CNC
3. Visualization
4. Fieldbus



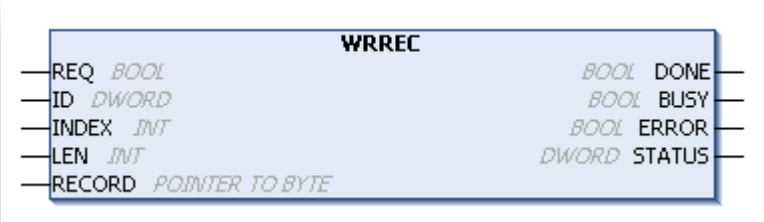




Fieldbus

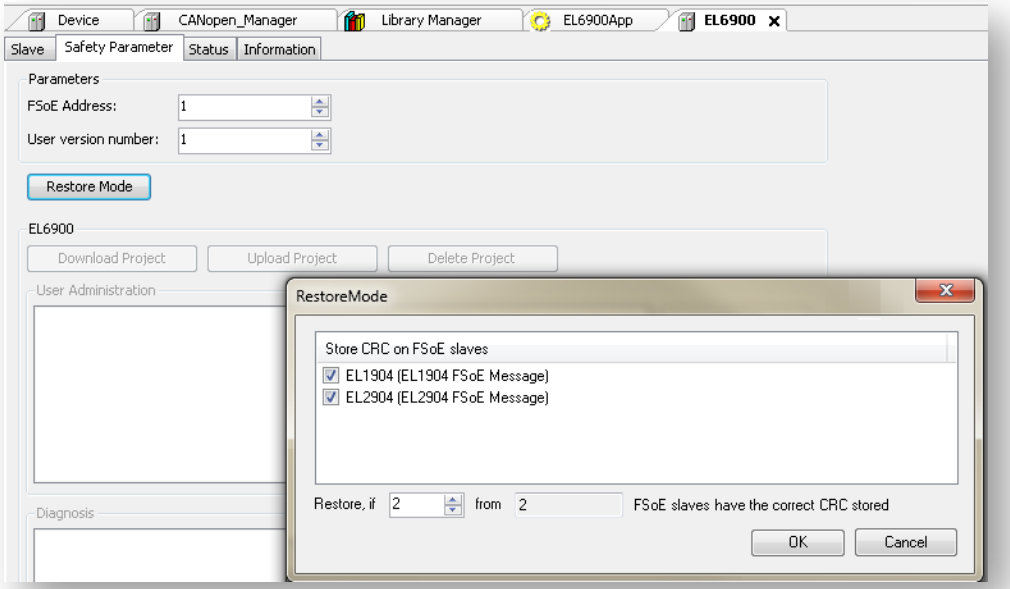
Fieldbus

- PROFIBUS / PROFINET:
  Standardized function blocks for an acyclic PROFIBUS and PROFINET communication



- IoDrvSercosIII: Most recent CoSeMa version supported
  - Latest Automata Sercos fieldbus card with FPGA version 4 now supported by IoDrvSercos3.library

- EtherCAT Safety:
  - The Safety project for the EL6900 can now be saved as a separated file. In case of a replacement of the module, the project will automatically be downloaded to the new module.



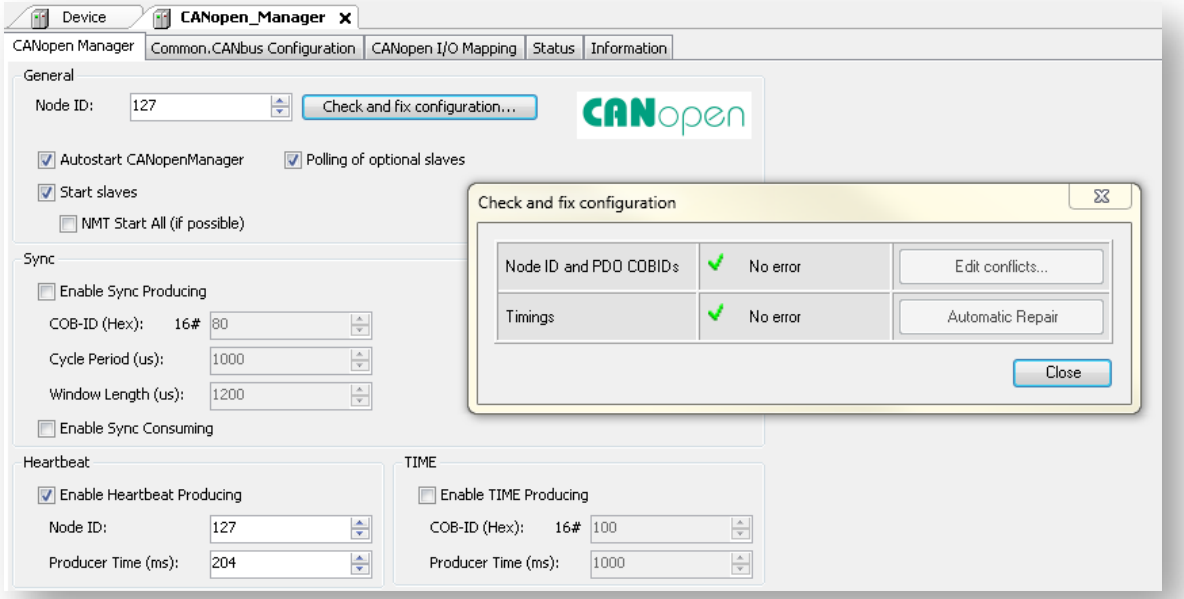
- EtherCAT Safety: Monitoring (EtherCAT Stack)
  - Inputs and outputs of specific EL6900 function blocks are now displayed.

- Device Editor: Sortation in the parameter list
  - By clicking in the head columns parameters, the generic device editor will be sorted.
    ➔ Easier searching for certain parameters

Slave | EtherCAT Configuration | EtherCAT I/O Mapping | Status | Information

Parameter	Type	Value	Default Value	Unit	Description
DC sync1 enable	BOOL	0	0		DC sync1 enable
DC sync0 enable	BOOL	0	0		DC sync0 enable
DC enable	BOOL	0	0		DC enable
CheckProductID	BOOL	TRUE	TRUE		CheckProductID
CheckVendorID	BOOL	TRUE	TRUE		CheckVendorID
Timeout Init to Preop	DWORD	3000	3000		Timeout Init to Preop
DC sync1 cycletime	DWORD	4000	0		DC sync1 cycletime
Timeout Preop to Safeop, SafeOp to Op	DWORD	10000	10000		Timeout Preop to Safeop, SafeOp to Op
Timeout SDO Access	DWORD	1000	1000		Timeout SDO Access
DC sync0 cycletime	DWORD	4000	0		DC sync0 cycletime
Number of TxPDOs of the Slave	DWORD	0	0		Number of TxPDOs of the Slave
Number of RxPDOs of the Slave	DWORD	0	0		Number of RxPDOs of the Slave
Number of FMMUs of the Slave	DWORD	0	0		Number of FMMUs of the Slave
Number of SyncManagers of the Slave	DWORD	0	0		Number of SyncManagers of the Slave
AutoIncr Address of the Slave	DWORD	0	0		AutoIncr Address of the Slave
Physical Address of the Slave	DWORD	1001	0		Physical Address of the Slave
Serialnumber of the Slave	DWORD	0	0		Serialnumber of the Slave
Revision Number of the Slave	DWORD	0	0		Revision Number of the Slave
Product Code of the Slave	DWORD	72100946	72100946		Product Code of the Slave
Vendor Id of the Slave	DWORD	2	2		Vendor Id of the Slave
Number of Identity Parameters	DWORD	4	4		Number of Identity Parameters
Timeout Back to SafeOp	DWORD	200	200		Timeout Back to SafeOp
Timeout Back to Init	DWORD	5000	5000		Timeout Back to Init
StationAlias	WORD	0			

- CANopen: Heartbeat / node guarding
  - „Check and Fix“ extended in the CANopen Manager. Now error of task cycle times are displayed, too (e.g. if the node guarding time is not a multiple of the task cycle time).
  - Now „AutoFix“ automatically eliminates all problems. In order to do so, time values will be rounded to the upper or lower values.



Thank you for your attention.